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"Knowledge Management and The Learning Cycle: A proposed framework to support project teams"

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By Laura Deutsch

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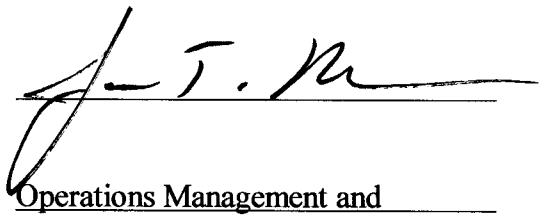
Faculty Approval Signature: 

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ABSTRACT:

The purpose of this study is to develop a framework to support project teams by looking into knowledge management and the learning cycle. Knowledge management's main objective is to capture, organize, and share what members of the organization know. The payoffs of effective knowledge management include fewer mistakes, less redundancy, quicker problem solving, better decision-making, reduced research, and improved end results. The learning cycle has been used to describe how people learn. Several different models are discussed and the basic concepts include understanding an experience or framing a project, planning what you need to learn, acting on the plans or getting what you need, and finally learning, reflecting , evaluating , and gaining understanding. This study involved action learning within a project team. I concluded the most effective way to work through the learning cycle and record the steps, along with the lessons learned. I also proposed that the use of the Lotus Notes/Domino

platform along with the "Raven" suite to be the most effective for project teams and knowledge management.

"Knowledge Management and The Learning Cycle: A proposed framework to support project teams"

ABSTRACT

The purpose of this study is to develop a framework to support project teams by looking into knowledge management and the learning cycle. Knowledge management's main objective is to capture, organize, and share what members of the organization know. The payoffs of effective knowledge management include fewer mistakes, less redundancy, quicker problem solving, better decision-making, reduced research, and improved end results. The learning cycle has been used to describe how people learn. Several different models are discussed and the basic concepts include understanding an experience or framing a project, planning what you need to learn, acting on the plans or getting what you need, and finally learning, reflecting , evaluating , and gaining understanding. This study involved action learning within a project team. I concluded the most effective way to work through the learning cycle and record the steps, along with the lessons learned. I also proposed that the use of the Lotus Notes/Domino platform along with the "Raven" suite to be the most effective for project teams and knowledge management.

What is Knowledge Management?

Over the last fifty years, information has become more important then physical capital. Most of the workers today are "knowledge workers" not factory workers. (Gray) Knowledge is the information possessed in the mind of individuals. It is personalized information related to facts, procedures, concepts, interpretations, ideas, observations, and judgments. (Tuomi 1999) (Alavani and Leidner). Knowledge can exist in several forms it can be data, intellectual capital (results from patents, copyrights, and/or Research and Design), or expertise (people having knowing things about what works and what doesn't. A company that has a low turnover has a large body of knowledge once the figure out how to share it, while an organization with high turnover is losing wealth every time someone leaves). (Hay) There are several assumptions that have been made that knowledge is different from data and information. Data is the raw facts and numbers, information is processed data and knowledge is authenticated information (Dreske 1981, Machlup 1983, Vance 1997).

Several taxonomies of knowledge have been defined. The importance of recognizing these different knowledge taxonomies is so the design of the knowledge management system will be able to support the different types of knowledge and the flows among them. These types include tacit knowledge, which is knowledge that is rooted in actions, experience and involvement in specific context. The cognitive aspect includes mental models consisting of mental maps, beliefs, paradigms and viewpoints. The technical aspect includes the concrete know how, crafts and skills that apply to specific work. A second type is Explicit; this is articulated, codified and communicated in symbolic form and or natural language. (Polanyi 1962, 1967), (Nonaka, 1994)

(Alavani and Leidner) The next two types are individual and social knowledge. Individual knowledge is knowledge that is created by and exists in the individual. Social knowledge is created by and exists in the collective actions of a group. (Nonaka 1994)(Hay) The next five types are Declarative, Procedural, Causal, Conditional, and Relational knowledge. These are the know-about, know-how, know-why, know-when, and know-with respectively. The final taxonomy is the Pragmatic knowledge, which is useful knowledge for an organization.

Knowledge Management as defined by Webster's New Collegiate Dictionary is "the fact or condition of knowing something with familiarity gained through experience or association". The GartnerGroup defined knowledge management as "the harnessing of a company's collective expertise to the right people at the right time. It's not a product but a process-the process of gathering, managing, and sharing your employees' knowledge. Knowledge management requires technology, business strategy, and people. (Mullins)

Knowledge management can be broken down into four different "knowledge processes" These processes are creation, storage/retrieval, transfer, and application. (Holzner, and Marx 1979; Pentland 1995) Knowledge creation consists of developing new content or replacing existing content. Knowledge storage and retrieval is where the knowledge is kept, how it is organized, and how it can be recalled. There have been empirical studies that show that while organizations create knowledge and learn they also forget (Argote et al. 1990; Darr et al. 1995) Therefore, the storage, organization, and retrieval of organizational knowledge is a very important aspect of an effective organizational knowledge management. (Stein and Zwass 1995; Walsh and Ungson

1991) (Alavani and Leidner). Knowledge transfer is the transportation of knowledge locations to where it is needed and can be used. This transfer can occur at several different levels, including between individuals, from individuals to explicit sources, from individuals to groups, across groups, and from the group to the organization. One concern that comes up with knowledge transfer is that without a formal coding policy there is no guarantee that the knowledge will be passes accurately from one member to others. This goes along with the problems with the recipient's ability to process the knowledge. Knowledge application is the using of the acquired knowledge. The knowledge-based theory for a firm states that the source of competitive advantage resides in the application of knowledge rather than knowledge itself. The four processes of creation, storage/retrieval, transfer and application are essential to effective organizational knowledge management. (Alavani and Leidner)

To accomplish knowledge management successfully the business strategy of an organization must acknowledge and actively foster an effort to capture knowledge. Technology cannot create knowledge, it simply stores it. Knowledge resides in people and effectively capturing it requires a great deal of effort. Knowledge management systems capture information that is more easily transferred into knowledge by the recipient. (Mullins) The main objective is to capture, organize, and share what members of the organization know. Knowledge management can pay off in fewer mistakes, less redundancy, quicker problem solving, better decision making, reduced research and development costs, increased worker independence, enhanced customer relations, and improved products and services. (Mullins)

There are several things to keep in mind when developing a system. The toughest part of knowledge management is finding what you need when you need it. Organizations should create and maintain easy to use "knowledge maps" and navigational tools. Effective systems require a supportive, collaboration culture without the traditional rivalries. Sloppy attempts at knowledge management result in too much information. Simply stockpiling data with little organization and no analysis results in wasted time looking for misplaced materials. Resources should be equally accessible enterprise wide, in every department and remote locations 24 hours a day. Material should be edited for consistency and relevancy, and include the names of the people who contributed the information so they can be found to answer question. ("Uneasy Pieces" 1996)

"A major determinant of whether the goals of successful knowledge management is achieved comes from the ability to manipulate the culture towards becoming a collaborative (knowledge-happy) environment. (If no one uses it or updates it for the purposes intended it is not a success)"

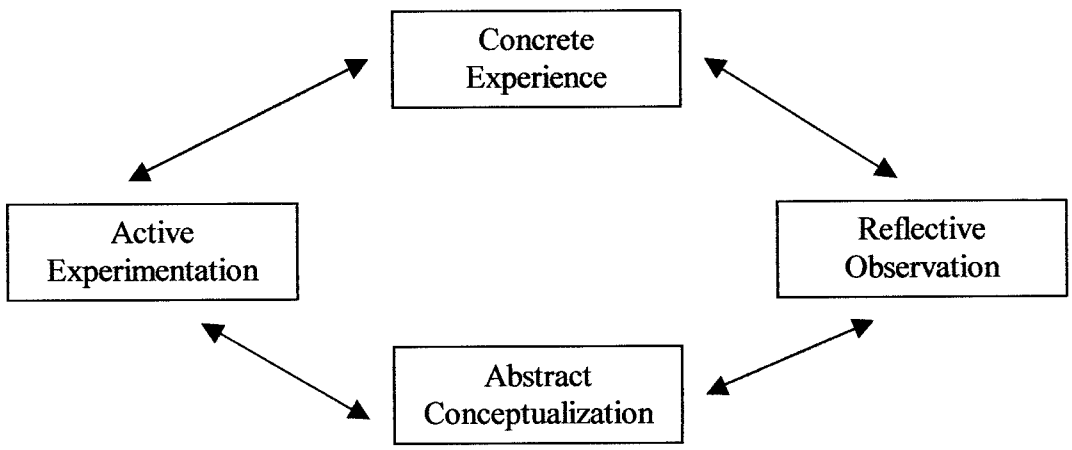
Learning Cycle Theory

Research has shown that learning is based on motivation, active involvement in the learning process, linking new concepts with familiar information, and applying new information to the real world. (Silver 1998) "The learning cycle is not a new idea. It derives from educator-philosopher John Dewey's notion of inquiry (1938). " Dewey came up with the idea that the best way to resolve uncertain situations is to thinking about problems in terms of what you know and don't know. Then taking practical actions

designed to obtain a new understanding. The learning cycle has been used to describe how people learn through everyday experiences (Kolb 1984; Honey and Mumford, 1995a), (Redding 1994) there are several different models of a learning cycle, but in a way, each of them is similar.

In the early 1980's, Rogers stated that "the heart of all learning lies in the way we process experience, in particular out critical refection of experience. Learning as a cycle that begins with experience, continues with reflection and later leads to action, which itself becomes a concrete experience for reflection." (Rogers 1996) (Kelly 1997)

Kolb went on to modify Rogers ideas, by adding a forth stage called "Abstract Conceptualization", therefore dividing the concept of reflection into two separate learning activities, perceiving and processing. (Algonquin 1996) (Kelly 1997) Kolb theorized that a learner goes through a full cycle of experiences requiring different skills before learning is complete. He also states "you can enter learning at any point in the cycle; however, for you to learn you must follow through with the entire process. " Kolb's learning cycle is pictured below.(Kolb 2000)



Concrete Experience: Learning from specific experiences, relating to people, and sensitivity to feelings and people.

Reflective Observation: The careful observations before making a judgment, viewing things from different perspectives, and looking for meaning in things.

Abstract Conceptualization: Logical analysis of ideas, systematic planning, acting on intellectual understanding of a situation.

Active Experimentation: The ability to get things done, risk taking, influence people and events through action. (Kelly 1997)

In the book, "Guidelines for Barefoot Language Learning" (1984), David Larson followed the pattern of a "learning cycle" using the acronym GLUE.

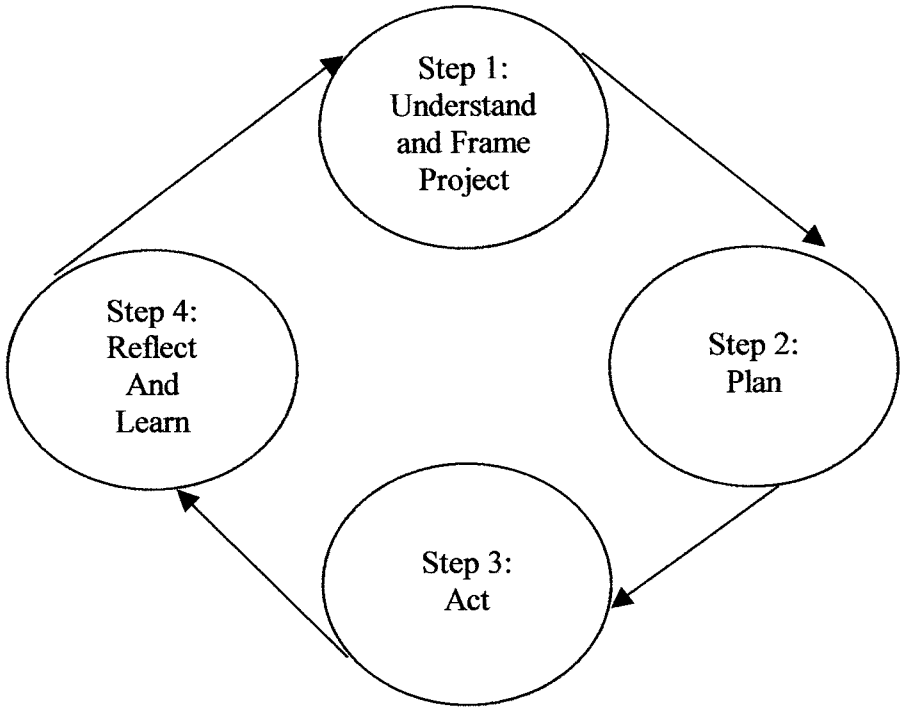
G - Get what you need. Getting what need should be 10% of your experience.

L - Learn what you get. Learning what you get should be 40% of your experience.

U - Use what you get. Using what you learn should be 40% of your experience.

E - Evaluate what you learn. Evaluating what you learn should be 10% of your experience.(Larson 1984)

In The Radical Team Handbook, there is an example of a team learning cycle. This is displayed below.



Understand and Frame the Project: Shared understanding of what is being done and how it will be done. Clarify purpose, goals, and deliverable of the project.

Plan: Plan actions that will allow the greatest learning. Test out the validity of assumptions. Answer the following questions.

What don't we know that we need to know?

What actions can we take between now and the next meeting to find out what we need to know?

How can we verify what we are assuming is actually true?

Act: Test assumptions, experiment, gather new information, and test new ideas.

Reflect and Learn: Reflect on what happened, and capture the lessons learned.

Another tool for project teams that was stated in the Radical Team Handbook was the idea of a team learning record. This powerful tool can help teams to plan actions and

will in turn generate knowledge. The record consists of four columns. The columns are What We Know, What We Don't Know, Assumptions, and Actions to Learn.

What We Know: Things about the project that are known facts, and there is evidence to prove that these items are true.

What We Don't Know: Things about the project that are not know and need to be done in order to successfully complete the project.

What We Assume: Things that could be true but there is no evidence to prove it.

Actions to Learn: The things that will be done to verify assumptions, and to discover what isn't known.

Several different descriptions of learning cycles were described above, but they were all very familiar in that they all attempt to describe how people learn. The basic concepts included understanding an experience or framing a project, planning what you need to learn, acting on the plans or getting what you need, and finally learning, reflecting , evaluating , and gaining understanding.

Outline of Process

The process that was tested during the last three months involved using the learning record and recording lessons learned. There were three groups involved. One of the groups used the learning record when starting the project but didn't continue it after the first meeting. This did give them a starting point and some direction. They felt that recording the learning record was to time consuming.

A second group recorded the learning record the first time also, but did continue to use the concept verbally. They said "It really helped us to organize our thoughts and

ideas, when ever we were stuck on something we would sit down and decide what we knew, what we didn't know and what we knew." They also mentioned that they would have recoded these actions if there was an easy way to do it.

Being part of the third group, we used the learning record and lessons learned throughout the duration of our project. We found this to be an excellent way to organize our project, and make sure we had all the information that we needed. We experimented with several different ways to organize and record our thoughts. These trials ranged from a simple word document to the excel document that was frequently changed and updated. We concluded that we would use the excel as our platform.

We decided that we need a way to determine the priority items from the rest so we started using a coloring system for the things we thought we knew and the things that we didn't know. We used four different colors ranging form high priority to low priority. The spreadsheet contained three categories; What we know? (Facts), What we think we know? (Assumptions), and What we don't know? (questions). We would place items under the appropriate categories to the stages that they were within our learning cycle. Each cell also contained comments. These comments were dated and initialed. They contained information about when the contents changed categories and what was currently being done to move the categories to facts. An item in the category of fact, was in bold and black. Many of the items contained a magnifying glass which was a hyperlink to a document, reference, or research related to that item.

Often times as items are being researched there are lessons that were learned. There was a hyperlink to a lessons learned page. Where all lessons learned about the project were recorded.

This system proved to be very efficient, easy to maintain, and a useful way to organize our thoughts and objectives. This is just one piece to a knowledge management system. This really focuses on a project that is in progress.

It is important that knowledge, and lessons learned from completed projects be achieved in order to guide new projects, gather ideas, and prevent the same mistakes for occurring multiple times. The lessons learned section is a great place for people to look and see what has worked in the past and what hasn't for projects similar to the ones that they are doing. In addition, the information stored in a knowledge management system can contain references to information or information that was already discovered, thus saving the new group time.

Implementation (Exchange vs. Lotus Notes)

Groupware is a tool for teams to coordinate activities, work on scheduling, keep members up to date, work out the details of documents, along with a repository for documents and databases. Lotus Notes and Microsoft Exchange both have built in technologies such as OLE and ActiveX controls into their groupware. (Pompili)

There are several differences between Microsoft Exchange 2000 and Lotus Notes/Domino. Lotus Notes commissioned a study, comparing the two applications. The study was performed by InfoKinetics, an independent consulting firm with top certifications in both platforms. A company called Creative Networks, Inc. (CNI) interviewed the developers, received all of the project work and documents, and produced a report based on their own analysis.

The study found that both applications provide useful functionality. Notes/Domino was less expensive to develop, cleaner, and provided more functionality. The development environment required is also less complex and less expensive.

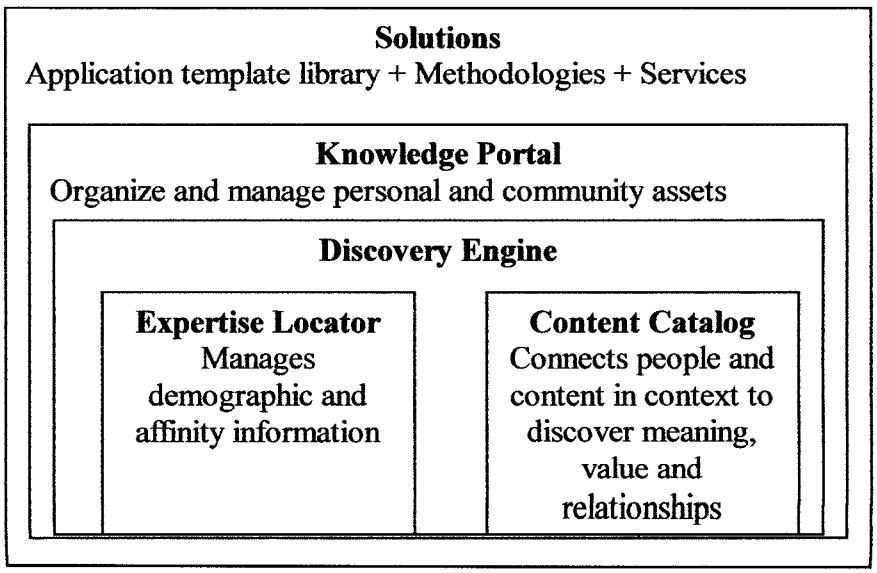
One of the difficulties that was encountered with the Exchange 2000 application was that it was so new and there is less information available. There was a lack of familiarity which led to a lengthened learning process. Exchange 2000 required more complex software and hardware, and is more difficult to maintain.(Osterman 2000)

The president of Infokinetics Inc., John Bugarin, said "We found Domino to be far more powerful and elegant as an application platform. Its maturity and consistency allowed out Domino team to spend its time creating business value, while the Exchange 2000 team spent a lot of energy learning a completely re architected version of an existing product, and integrating disparate products into the solution. Exchange development requires a server due to the dependency on Windows 2000 and Active Directory. Domino development is done at any workstation and can be hosted on many server operating systems, including Windows NT, sun solaris, all IBM platforms, and Linux." (Shamrell 2001)

Notes/Domino is an easier development in which to create customized applications than exchange. Therefore, a department power user of Notes/Domino not a professional programmer can create an application that meets his or her department's requirement for a customized application. A higher level of programming skills are required for application development in Exchange vs. Notes/Domino. Notes/Domino permits Rapid Application Development so it can be used at lower levels in the organization.(Osterman 2000)

Lotus Notes has a knowledge management suite called "Raven". This suite contains tools for content tracking and analysis, user profiling and expertise location, a knowledge portal to manage personal and community information and activity, and an application integration tool kit. "Raven builds upon Domino's messaging and groupware infrastructure to create a fully integrated knowledge management platform that fosters successful knowledge creation and sharing by bringing people and content together in a virtual collaborative setting" ("Lotus Showcases Knowledge Management Product Offering" 1999) The "Raven" suite catalogs content and people, determines value, meaning and relationships, delivers the right information to the right people at the right place and time; and provides communities with a tailored environment to work in.

The "Raven" provides a portal that allows end users and communities to find and discover useful information and applications on a given subject, make users aware of other knowledgeable people in the organization, and organizes related tasks, teams, and projects. This product has three key technologies these include the knowledge portal, discovery engine, and applications template. ("Raven Q & A") It is set up as shown below.("Project Raven Overview")



The application template provides the means to develop customized knowledge management applications. The knowledge portal organizes the user's information, applications and contacts by community, interest, task or job focus. This area may contain the users mail, calendar, discussions, and to do items, team rooms, custom applications, web sites, ect. The discovery engine is a tool that looks through documents and categorizes content and organizational expertise into a browsable and searchable catalog. There are two main components to the discovery engine they are the expertise locator and the content catalog. ("Raven Q & A, Project Raven Overview, Lotus Showcases")

The Raven is a tool that can cover a wide spectrum of knowledge management by allowing organizations to improve knowledge information and sharing, accelerate rates of innovation, increase productivity, and allow employee access to pertaint documents.

Microsoft does have an impressive set of tools to create, organize, and distribute both structured and unstructured data, but it is difficult to get to these tools because each back office server has its own APIs and Object models. It has been reported that Microsoft is working on the development of a consistent development platform through a server with common templates. (Kramer 1999) It has been suggested that careful consideration is taking before choosing Microsoft Exchange 2000 because "In return for a huge investment of time and resources, they will get severely limited collaborative capability on a platform that Microsoft now acknowledges to be a dead-end" ("Exchange 2000: You Can't Teach an Old Dog New Tricks, 2001").

Recommendations

My experience and research has led me to recommend that the BITTC center begin to use Lotus Notes/Domino as the centers application platform. Lotus Notes is an excellent groupware tool, which allows for excellent collaboration between individuals, from individuals to explicit sources, from individuals to groups, across groups, and from the group to the organization. Lotus notes provides excellent tools, for e-mail, discussions, calendars, coordinating activities, keeping members up to date, working out the details of documents, team collaboration, to do lists, and organization just to mention a few features. Lotus notes is a relatively easy to use development environment, which has the possibilities of bringing together the BITTC center to work as one complete organization that focuses on specific projects.

Further more, I recommend that the "Raven" suite for Lotus Notes be implemented at the same time. This product is an excellent solution to knowledge management. "Raven" would provide a place to store documents and past projects, which can easily be accessed in the future. This would be very beneficial for teams to use as a reference. It contains tools for content tracking and analysis, user profiling and expertise location, a knowledge portal to manage personal and community information and activity, and an application integration tool kit. This would allow future project teams to learn from the experience of past project teams.

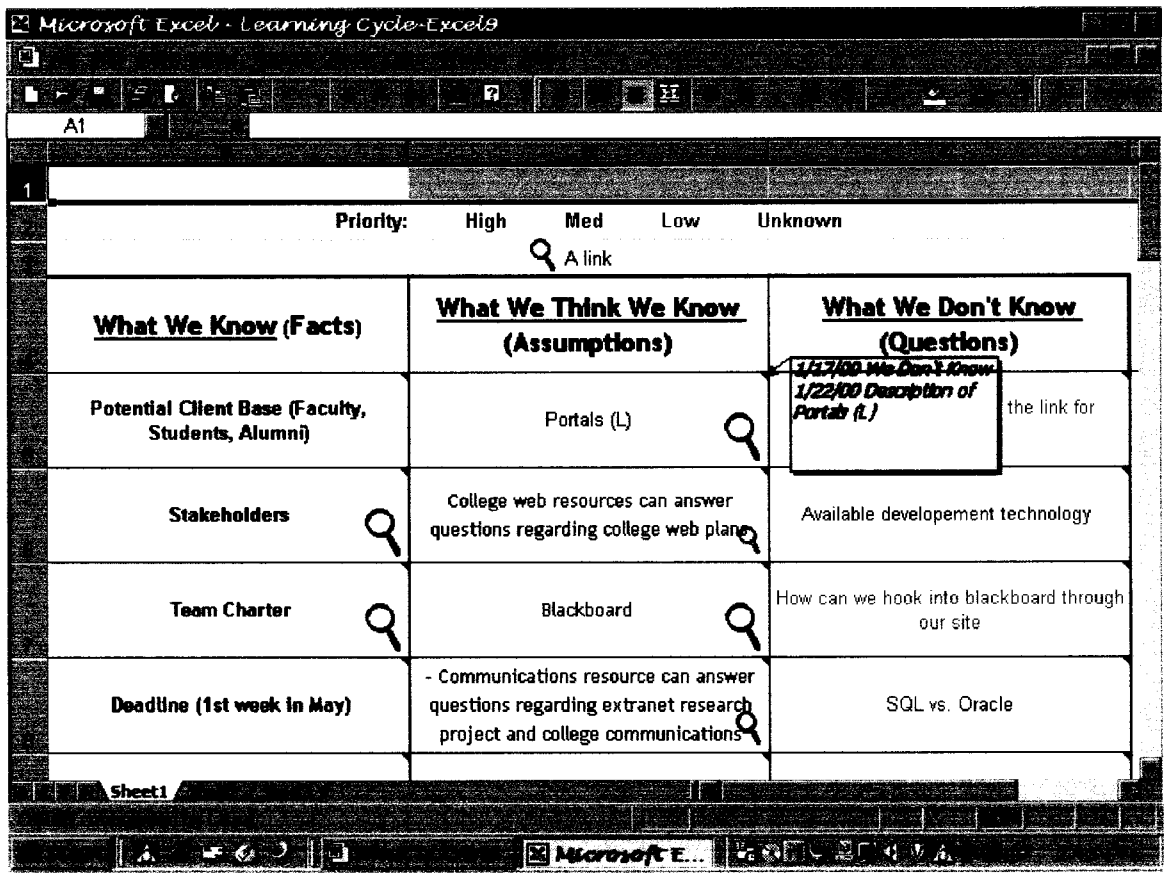
My recommendation for the process to be included with the environment begins with the initial meeting. When beginning a project it is important for team members to

know what is expected of them, and to define what they expect of others. An excellent way to record this is with the chart below.

What I Expect for Myself	What I Bring to My Team	What I Expect of My Teammates

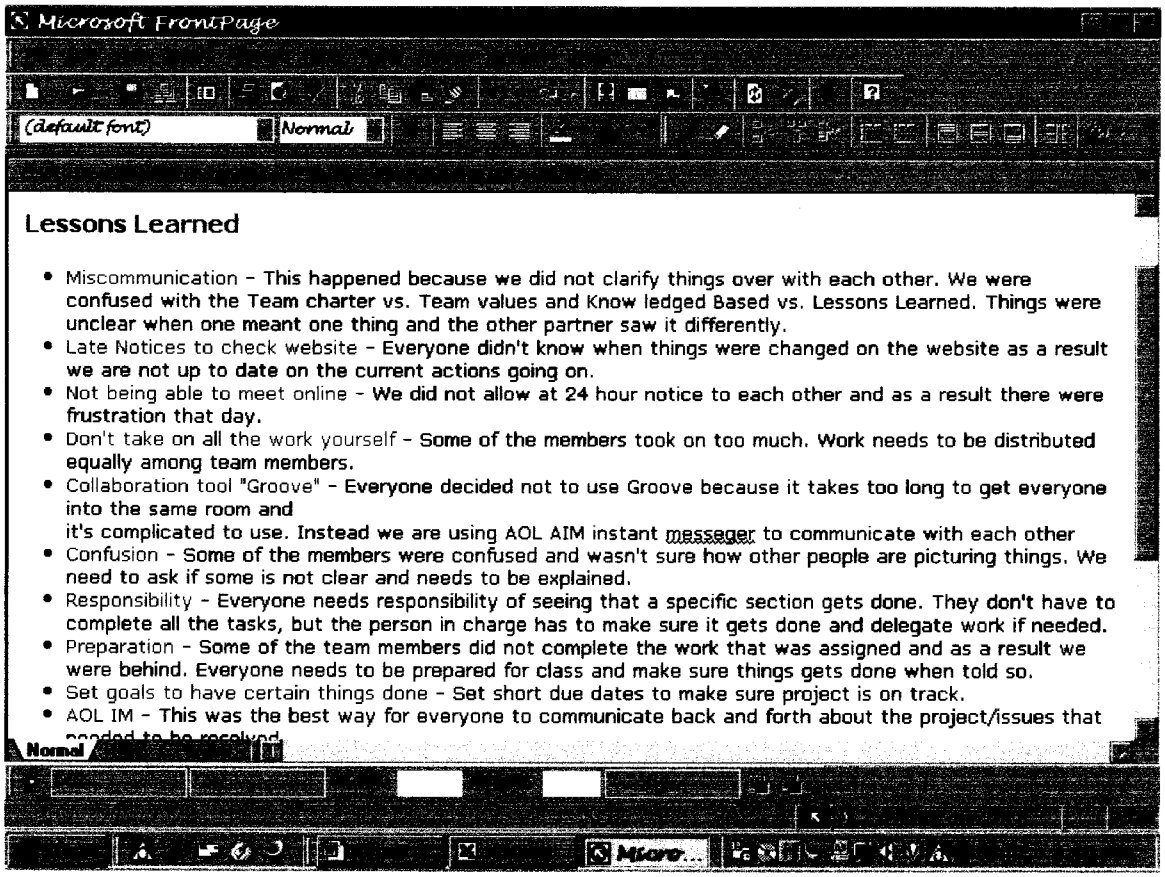
This chart can be saved within the teams work folder and later put into the knowledge repository for people to view in the future. (Wolfe 1999)

I have also found that the learning record is a very valuable tool for teams to keep a focus. The learning record can be created in Excel. A screen print of the proposed template is shown below.



The record contains three columns; What We Know, What We Think We Know, and What We Don't Know. There are four degrees of priority each with its own color. The magnifying glass represents a hyperlinks; this hyperlink connects to any pertinent document or research related to the object in the square. There are also comments in each box; these comments show the history and status of each object. There are dates for every time the object has changed status or is being worked on, along with the initials of the person who is looking into that object. Once an object is moved to the What We Know category, it is bolded. This chart also contains a link to lessons learned and a link to immediate actions.

The lessons learned table is shown below.



Lessons Learned is recorded in an html document in this case, but it could also be a simple word document. As you can see each lesson is recorded with a title and then a description. While a project is being completed, and is completed it is important to document how and why things are done the way that they are. This is so that the project can be updated in the future or other projects can follow that same methodology.

Overall, I think that the application of Lotus Notes, and the "Raven" suite; along with the use of the expectations record, learning record, lessons learned, and project documentation will provide for an excellent learning environment within the BITTC center now and in the future.

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